Tech Fact Sheet

Oak Ridge National Laboratory — ***Tennessee***
Florida International University — ***Florida***

Decision Support Tool for Prioritization of Resources Dedicated to Surveillance and Maintenance Activities

Challenge

The Department of Energy (DOE) currently faces a difficult task in the disposition of excess facilities. Many of these facilities are large and complex and contain potentially hazardous substances. Operational experience shows that once buildings have been declared excess and are transferred to surveillance and maintenance (S&M), maintenance budgets are reduced since the planned demolition of the building is used as a justification for not spending money to make repairs on it. One need identified at the Oak Ridge National Laboratory (ORNL), and mentioned in Energy Facility Contractors Group Best Practice #50, is estimating and securing adequate funding for the maintenance of abandoned inactive facilities. The current challenges are to identify the essential maintenance requirements and to estimate the cost required to keep the facility in stable condition, taking into consideration the uncertainties of how long the building may need to be maintained prior to demolition. At ORNL, the Complex Facility Manager controls the ORNL facility maintenance funding and is responsible for maintaining active occupied facilities as well as excess facilities. Prioritization of maintenance activities and the allocation of resources are difficult when balancing the needs of multiple active existing versus future excess facilities.

Technical Solution

A decision support tool was created for a personal computer platform to provide the DOE Environmental Management (EM) Federal project directors and their contractors with a tool to aid in prioritizing the investment of S&M resources to optimize the effectiveness of the limited budget. The analytical hierarchy process (AHP), a multi-criteria decision-making method, was used to derive the weight of importance of a defined list of risk-based criteria and typical S&M activities.

Risk Criteria
Extent of Contamination
Facility Nuclear Categorization
Environment Safety & Health (ES&H)
Time Until D&D
Accumulated Delayed Maintenance Estimates
Time Since Declared Excess
Status of Legacy Material Cleanout

Typical S&M Activities
Contamination Control
Roof Repair
Safety Basis Surveillance
Ventilation
Fire System Maintenance
HVAC
Steam Repair
Structural Repair
Grounds Keeping
Legacy Waste Removal
Liquid Waste Systems

Site Project & Identifier	Tech Stage: Development
Planning and Analysis – Decision Tool for Surveillance & Maintenance	A decision analysis tool is being developed by ORNL and FIU

Tech Accomplishment
A total of 10 facilities at ORNL, varying in perceived hazards and conditions, were chosen to test the tool by evaluating them with respect to each risk criterion and combining these results with the weighted importance of the S&M they require. The final result was a ranking of S&M activities to be performed on all the facilities based on the relative weight of importance of the activity coupled with the risk posed by the facility. This method addressed the needs of all of the facilities without ignoring the S&M activities of the lower-risk facilities. In doing so, the site can prevent the lower-risk facilities from becoming a higher risk in the future.

The result of this study was analyzed for consistency and reflected the overall technical judgment of subject matter experts, based on the facilities used in the test. This tool can be a starting point to determine how to distribute S&M budgets, to make consistent and risk-based decisions and to provide documentation for future reference and review. In addition, the tool is flexible enough to be modified and used at other DOE sites. Several factors, which include the weights assigned to each criterion, the final ranking of the facilities and the S&M actions, are subject to the judgment of the decision maker. For this reason, a sensitivity analysis will be the next step to improve the decision tool.

Impact
This tool can help mitigate increased costs to future D&D by making project managers more aware of the risks and consequences of S&M decisions. It will help decision makers make consistent and risk-based decisions in a defensible and traceable manner and provide documentation for future reference. The tool is flexible enough to be modified and used at other DOE sites.

Impact and Features

- Cost savings – may reduce additional cost to D&D in the future.
- Worker risk reduction – may reduce risk of injuries from structural failure of facilities and health problems due to inadequate S&M.
- Environment risk reduction –may reduce risk of contamination spread due to inadequate S&M.
- Improved management - provides documentation for future reference and to justify budget allocation decisions.

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Challenge Category	Tech Solution Category
Surveillance & Maintenance/D&D	Decision Analysis Tools